UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,955	12/13/2005	Maik Rabe	10191/4172	1384

26646 7590 08/23/2007

KENYON & KENYON LLP
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER	
BERNSTEIN, ALLISON	
ART UNIT	**PAPER NUMBER**
2824	

MAIL DATE	DELIVERY MODE
08/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,955	RABE ET AL.	
	Examiner	Art Unit	
	Allison Bernstein	2824	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-23 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 08 June 2005 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 6/8/2005.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: Search History.

DETAILED ACTION

Claims 11-23 are pending in the application. Claims 1-10 have been cancelled.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

Acknowledgment is made of applicant's Information Disclosure Statement (IDS), Form PTO-1449, filed 8 June 2005. The information therein was considered.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the third magnetic layer, fourth magnetic layer, and the second non-magnetic intermediate layer must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 17 is objected to because of the following informalities:

There is no antecedent basis for the claimed limitation "the layer stack." "The layer stack" should be replaced with --the magnet-resistive layer stack--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 11-13, 15-17, and 20-23** are rejected under 35 U.S.C. 102(b) as being anticipated by Sakakima et al. (US 5,841,611) ("Sakakima").

3. **Regarding claim 11,** Sakakima discloses, in figure 24, a magneto-resistive layer system comprising: a magneto-resistive layer stack (including, for example, 103, 102, 103 at the top of the figure); and at least one layer arrangement situated in an environment of the magneto-resistive layer stack working on the basis of one of a GMR effect and an AMR effect, which generates a resulting magnetic field acting upon the magneto-resistive layer stack, the layer arrangement including a first magnetic layer (including 101 or 103 below magneto-resistive stack), a second magnetic layer (including 101 or 103 below magneto-resistive stack), and a non-magnetic intermediate layer (including 102 below magneto-resistive stack) separating the first magnetic layer (including 101 or 103 below magneto-resistive stack) and the second magnetic layer (including 101 or 103 below magneto-resistive stack) from one another, the first

magnetic layer and the second magnetic layer being ferromagnetically exchange-coupled via the intermediate layer.

4. **Regarding claim 12,** Sakakima discloses, in figure 24, the magneto-resistive layer system according to claim 11, wherein one of: (a) the first magnetic layer (for example 103) is a magnetically soft layer, made of permalloy, CoFe, Co, Fe, Ni, FeNi as well as magnetic alloys containing these materials (column 4 lines 25-26), and the second magnetic layer (for example 103) is a magnetically hard layer, made of one of CoSm, CoCrPt, CoCrTa, Cr and CoPt, (column 4 lines 29-30) and (b) the first magnetic layer is a magnetically hard layer, made of one of CoSm, CoCrPt, CoCrTa, Cr and CoPt, and the second magnetic layer is a magnetically soft layer, made of permalloy, CoFe, Co, Fe, Ni, FeNi, as well as magnetic alloys containing these materials (see also 1, 2, 3 in figure 1, and 103, 102-1, 102-2, 102-1, 101 in figure 22).

5. **Regarding claim 13,** Sakakima discloses, in figure 24, the magneto-resistive layer system according to claim 11, wherein each of the first magnetic layer (for example 101) and the second magnetic layer (for example 101) is a magnetically hard layer, made of one of CoSm, CoCrPt, CoCrTa, Cr and CoPt (column 4 lines 29-30).

6. **Regarding claim 15,** Sakakima discloses, in figure 24, the magneto-resistive layer system according to claim 11, wherein the layer stack has a third magnetic layer (including 101 or 103 below 1st and 2nd magnetic layers) and a fourth magnetic layer (including 101 or 103 below 1st and 2nd magnetic layers) which are separated from one another by a second non-magnetic intermediate layer (including 102 below 1st non-magnetic layer), and the non-magnetic intermediate layer of the layer arrangement and

the second non-magnetic intermediate layer of the layer stack at least one of (a) are at least substantially made of the same material and (b) have a substantially equal thickness (column 4 lines 34-35).

7. **Regarding claim 16,** Sakakima discloses, in figure 24, the magneto-resistive layer system according to claim 11, wherein the non-magnetic intermediate layer (102) is made of at least one of (a) copper, (b) and alloy one of including and made of copper, (c) silver and gold, and (d) ruthenium (column 4 lines 34-35).

8. **Regarding claim 17,** Sakakima discloses, in figure 24, the magneto-resistive layer system according to claim 11, wherein the layer arrangement is situated at least one of (a) on top of, (b) underneath and (c) next to the magneto-resistive layer stack (see figure 24, the layer arrangement could be for example underneath the magneto-resistive layer stack).

9. **Regarding claim 20,** Sakakima discloses, in figure 24, the magneto-resistive layer system according to claim 11, wherein, in response to a change in a temperature to which the magneto-resistive layer system (figure 24) is exposed, one of a changing sensitivity and a shifting working point of the magneto-resistive layer stack (including, for example, 103, 102, 103 at the top of the figure) with respect to an external magnetic field to be measured with respect to at least one of strength and direction, is at least partially compensated within a predefined temperature interval by the resulting magnetic field generated by the layer arrangement (including 101/103, 102, and 101/103 below magneto-resistive stack), which also changes as a result of the temperature change (this is a recitation of intended use of the claimed invention).

10. **Regarding claim 21,** Sakakima discloses, in figure 24, the magneto-resistive layer system according to claim 20, wherein the compensation is performed completely and the temperature interval is -30°C to +200°C (this is a recitation of intended use of the claimed invention).

11. **Regarding claim 22,** Sakakima discloses, in figure 24, a sensor element comprising a magneto-resistive layer system, the magneto-resistive layer system including: a magneto-resistive layer stack (including, for example, 103, 102, 103 at the top of the figure); and at least one layer arrangement situated in an environment of the magneto-resistive layer stack working on the basis of one of a GMR effect and an AMR effect, which generates a resulting magnetic field acting upon the magneto-resistive layer stack, the layer arrangement including a first magnetic layer (including 101 or 103 below magneto-resistive stack), a second magnetic layer (including 101 or 103 below magneto-resistive stack), and a non-magnetic intermediate layer (including 102 below magneto-resistive stack) separating the first magnetic layer and the second magnetic layer from one another, the first magnetic layer and the second magnetic layer being ferromagnetically exchange-coupled via the intermediate layer.

12. **Regarding claim 23,** Sakakima discloses, in figure 24, the sensor element according to claim 22, wherein the sensor element is for detecting magnetic fields with respect to at least one of strength and direction (this is a recitation of intended use of the claimed invention).

13. **Claims 11, 14-23** are rejected under 35 U.S.C. 102(e) as being anticipated by Den (US 6,611,034).

14. **Regarding claim 11,** Den discloses, in figure 2B, a magneto-resistive layer system comprising: a magneto-resistive layer stack (16, 18, 17 at top of figure); and at least one layer arrangement situated in an environment of the magneto-resistive layer stack working on the basis of one of a GMR effect and an AMR effect, which generates a resulting magnetic field acting upon the magneto-resistive layer stack, the layer arrangement including a first magnetic layer (16 below magneto-resistive stack), a second magnetic layer (17 below magneto-resistive stack), and a non-magnetic intermediate layer (18 below magneto-resistive stack) separating the first magnetic layer (16 below magneto-resistive stack) and the second magnetic layer (17 below magneto-resistive stack) from one another, the first magnetic layer and the second magnetic layer being ferromagnetically exchange-coupled via the intermediate layer.

15. **Regarding claim 14,** Den discloses, in figure 2B, the magneto-resistive layer system according to claim 11, wherein the first magnetic layer (16) has a different thickness than the second magnetic layer (17) (column 5 lines 25-27).

16. **Regarding claim 15,** Den discloses, in figure 2B, the magneto-resistive layer system according to claim 11, wherein the layer stack has a third magnetic layer and a fourth magnetic layer which are separated from one another by a second non-magnetic intermediate layer (see bottom of figure), and the non-magnetic intermediate layer of the layer arrangement and the second non-magnetic intermediate layer of the layer stack at

least one of (a) are at least substantially made of the same material and (b) have a substantially equal thickness (see figure).

17. **Regarding claim 16,** Den discloses, in figure 2B, the magneto-resistive layer system according to claim 11, wherein the non-magnetic intermediate layer (18) is made of at least one of (a) copper, (b) and alloy one of including and made of copper, (c) silver and gold, and (d) ruthenium (column 6 lines 33-36).

18. **Regarding claim 17,** Den discloses, in figure 2B, the magneto-resistive layer system according to claim 11, wherein the layer arrangement is situated at least one of (a) on top of, (b) underneath and (c) next to the magneto-resistive layer stack (underneath, see figure).

19. **Regarding claim 18,** Den discloses, in figure 2B, the magneto-resistive layer system according to claim 11, wherein at least one of the first magnetic layer and the second magnetic layer has a thickness between 10 nm and 100 nm (column 6 lines 25-30).

20. **Regarding claim 19,** Den discloses, in figure 2B, the magneto-resistive layer system according to claim 18, wherein the thickness is between 20 nm and 50 nm (column 6 lines 25-30).

21. **Regarding claim 20,** Den discloses, in figure 2B, the magneto-resistive layer system according to claim 11, wherein, in response to a change in a temperature to which the magneto-resistive layer system is exposed, one of a changing sensitivity and a shifting working point of the magneto-resistive layer stack with respect to an external magnetic field to be measured with respect to at least one of strength and direction, is at

least partially compensated within a predefined temperature interval by the resulting magnetic field generated by the layer arrangement, which also changes as a result of the temperature change (this is a recitation of intended use of the claimed invention).

22. **Regarding claim 21,** Den discloses, in figure 2B, the magneto-resistive layer system according to claim 20, wherein the compensation is performed completely and the temperature interval is -30°C to +200°C (this is a recitation of intended use of the claimed invention).

23. **Regarding claim 22,** Den discloses, in figure 2B, a sensor element comprising a magneto-resistive layer system, the magneto-resistive layer system including: a magneto-resistive layer stack (16, 18, 17 at top of figure); and at least one layer arrangement situated in an environment of the magneto-resistive layer stack working on the basis of one of a GMR effect and an AMR effect, which generates a resulting magnetic field acting upon the magneto-resistive layer stack, the layer arrangement including a first magnetic layer (16 below magneto-resistive stack), a second magnetic layer (17 below magneto-resistive stack), and a non-magnetic intermediate layer (18 below magneto-resistive stack) separating the first magnetic layer and the second magnetic layer from one another, the first magnetic layer and the second magnetic layer being ferromagnetically exchange-coupled via the intermediate layer.

24. **Regarding claim 23,** Den discloses, in figure 2B, the sensor element according to claim 22, wherein the sensor element is for detecting magnetic fields with respect to at least one of strength and direction (this is a recitation of intended use of the claimed invention).

Conclusion

When responding to this office action, applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner in locating appropriate paragraphs.

A shortened statutory period for response to this action is set to expire three months and zero days from the date of this letter. Failure to respond within the period for response will cause this application to become abandoned (see MPEP 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allison Bernstein whose telephone number is 571-272-9011. The examiner can normally be reached on Monday-Thursday 7AM-6PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on 571-272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

APB

ANH PHUNG
PRIMARY EXAMINER